

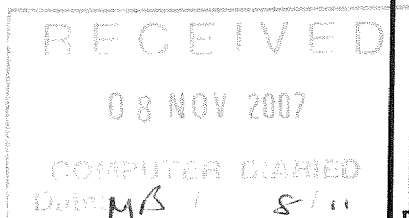
# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

# PCT

To:

F.R. KELLY & CO.  
Attn. Boyce, Conor  
27 Clyde Road  
Ballsbridge  
Dublin 4  
IRLANDE



NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference P82018PC00	Date of mailing (day/month/year) 08/11/2007
International application No. PCT/EP2007/006540	International filing date (day/month/year) 23/07/2007
Applicant  FOTONATION VISION LIMITED	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.

**Where?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes  
1211 Geneva 20, Switzerland, Fascimile No.: (41-22) 338.82.70

**For more detailed instructions**, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.  
☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

**4. Reminders**

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
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Authorized officer

Isabel Viegas da Cruz

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference  P82018PC00	<b>FOR FURTHER ACTION</b> see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No.  PCT/EP2007/006540	International filing date ( <i>day/month/year</i> )  23/07/2007	(Earliest) Priority Date ( <i>day/month/year</i> )  05/03/2007
Applicant  FOTONATION VISION LIMITED		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed  
☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☐ **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant  
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant  
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 3  
☒ as suggested by the applicant  
☐ as selected by this Authority, because the applicant failed to suggest a figure  
☐ as selected by this Authority, because this figure better characterizes the invention  
 b. ☐ none of the figures is to be published with the abstract

## INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2007/006540

A. CLASSIFICATION OF SUBJECT MATTER  
INV. G06K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/264744 A1 (ZHANG LEI [CN] ET AL) 30 December 2004 (2004-12-30)  abstract; figures 3-6 paragraphs [0005], [0061] - [0071], [0076] - [0078], [0082] - [0087]	1-16, 18-27, 31,32
X	HENRY A. ROWLEY: "Neural Network-Based Face Detection" May 1999 (1999-05), CARNEGIE MELON UNIVERSITY, PITTSBURG, PA, USA, XP002456221 Chapter 6 page 92 subsection 8.3  ----- -/--	1-9,11, 19-32

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

25 October 2007

Date of mailing of the international search report

08/11/2007

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Alecú, Teodor Iulian

## C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HANJIN RYU ET AL: "Coarse-to-Fine Classification for Image-Based Face Detection" IMAGE AND VIDEO RETRIEVAL LECTURE NOTES IN COMPUTER SCIENCE;;LNCS, SPRINGER-VERLAG, BE, vol. 4071, July 2006 (2006-07), pages 291-299, XP019036040 ISBN: 3-540-36018-2 Sections 1 and 3	1-4, 6-28,31, 32
X	EP 1 626 569 A (FUJI PHOTO FILM CO LTD [JP]) 15 February 2006 (2006-02-15)  paragraphs [0077], [0087] - [0099], [0107] - [0111], [0121] - [0124], [0161]	1-9, 11-16, 18,19, 21,23-32
X	MEKUZ, N. AND DERPANIS, K.G. AND TSOTSOS, J.K.: "ADAPTIVE STEP SIZE WINDOW MATCHING FOR DETECTION" PROCEEDINGS OF THE 18TH INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION, vol. 2, August 2006 (2006-08), pages 259-262, XP002455696 Hong Kong, China Sections 1 and 2	1-6, 11-18, 23-27, 31,32
X	SMERALDI F ET AL: "Facial feature detection by saccadic exploration of the Gabor decomposition" IMAGE PROCESSING, 1998. IICIP 98. PROCEEDINGS. 1998 INTERNATIONAL CONFERENCE ON CHICAGO, IL, USA 4-7 OCT. 1998, LOS ALAMITOS, CA, USA,IEEE COMPUT. SOC, US, vol. 3, 4 October 1998 (1998-10-04), pages 163-167, XP010586874 ISBN: 0-8186-8821-1 Sections 4 to 6 Sub-section 7.2	1-4,11, 12, 14-16, 18-20, 22-28, 31,32
X	FROBA, B., ERNST, A. AND KUBLBECK, C.: "Real time face detection" PROCEEDINGS OF IASTED "SIGNAL AND IMAGE PROCESSING", [Online] 2002, pages 1-6, XP002455698 Kauai, Hawaii Retrieved from the Internet: URL:http://www.embassi.de/publi/veroeffent/Froeba.pdf> [retrieved on 2007-10-23] Sections 1,2,6	1-4, 6-11,19, 21,23-32

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## INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2007/006540

## C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FERAUD R ET AL: "A FAST AND ACCURATE FACE DETECTOR BASED ON NEURAL NETWORKS" IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE, IEEE SERVICE CENTER, LOS ALAMITOS, CA, US, vol. 23, no. 1, 1 January 2001 (2001-01-01), pages 42-53, XP001008995 ISSN: 0162-8828 Section 2; subsection 2.1 Section 3 -----	1-4,6-9, 11, 19-28, 31,32
A	FROBA, B. AND ERNST, A.: "Face detection with the modified census transform" PROCEEDINGS OF THE SIXTH IEEE INTERNATIONAL CONFERENCE ON AUTOMATIC FACE AND GESTURE RECOGNITION, 2004, pages 91-96, XP002455697 cited in the application the whole document -----	1-32
A	US 2006/029265 A1 (KIM JUNGBAE [KR] ET AL) 9 February 2006 (2006-02-09) abstract; figures 1,8 paragraphs [0029] - [0055] -----	1-32

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2007/006540

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2004264744	A1	30-12-2004	NONE		
EP 1626569	A	15-02-2006	JP 2006285944	A	19-10-2006
			US 2006035259	A1	16-02-2006
US 2006029265	A1	09-02-2006	KR 20060012777	A	09-02-2006

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/EP2007/006540

International filing date (day/month/year)  
23.07.2007

Priority date (day/month/year)  
05.03.2007

International Patent Classification (IPC) or both national classification and IPC  
INV. G06K9/00

Applicant  
FOTONATION VISION LIMITED

### 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.O. 5818 Patentlaan 2  
NL-2280 HV Rijswijk - Pays Bas  
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl  
Fax: +31 70 340 - 3016

Date of completion of  
this opinion

see form  
PCT/ISA/210

Authorized Officer

Alecu, Teodor Iulian

Telephone No. +31 70 340-4439



**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/EP2007/006540

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of:
  - ☒ the international application in the language in which it was filed
  - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ on paper
    - ☐ in electronic form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in electronic form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:



**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/EP2007/006540

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	<u>3,9</u>
	No: Claims	<u>1,2,4-8,10-32</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-32</u>
Industrial applicability (IA)	Yes: Claims	<u>1-32</u>
	No: Claims	

2. Citations and explanations

see separate sheet

**Re Item V.**

Reference is made to the following documents:

- D1 : US 2004/264744 A1 (ZHANG LEI [CN] ET AL) 30 December 2004
- D2 : HENRY A. ROWLEY: "Neural Network-Based Face Detection" May 1999, CARNEGIE MELON UNIVERSITY, PITTSBURG, PA, USA
- D3: HANJIN RYU ET AL: "Coarse-to-Fine Classification for Image-Based Face Detection", IMAGE AND VIDEO RETRIEVAL, LNCS, SPRINGER-VERLAG, vol. 4071, July 2006, pages 291-299
- D4: EP-A-1 626 569 (FUJI PHOTO FILM CO LTD [JP]) 15 February 2006 (2006-02-15)

1. The present application does not meet the criteria of Article 33(1) PCT, because **the subject-matter of independent claims 1, 31 and 32 is not new** in the sense of Article 33(2) PCT.

1.1 Zhang & al. disclose in document D1 *a method of detecting a face in an image (abstract) comprising:*

- ◆ *performing face detection within a first window of said image at a first location (paragraph 83);*
- ◆ *obtaining from said face detection a confidence level indicating a probability of said image including a face at or in the vicinity of the first location (paragraph 83);*
- ◆ *performing said face detection within a second window at a second location wherein said second location is determined based on said confidence level (paragraph 83).*

Hence, **the subject matter of claim 1 is not new with respect to the teachings of the document D1.**

1.2 Documents D2, D3 and D4 disclose coarse/fine scanning procedures for face detection, wherein at first the scanning window is displaced with high increments, and a second refined search is performed around the coarse position where the face detection confidence is high enough (D2, see page 92, first paragraph; D3, see section 3; D4, see paragraphs 121 and 123).

Thus, the position of a second window is determined based on the confidence level of a first detection. It is therefore noted that **the subject matter of claim 1 is not new with respect to the teachings of either of the documents D2, D3 or D4.**

1.3 The objections above apply mutatis mutandis to **the subject matter of claims 31 and 32, which is also not new.**

2. Further, **the subject matter of dependent claims 2 to 30 is not new or does not involve an inventive step** in the sense of Article 33 PCT.

2.1 The features of claims 2, 4, 6, 7, 8, 10, and 11 are implicitly and/or explicitly disclosed in D1 (claims 2, 10, 11 see paragraphs 84 and 85; claims 4, 6, 7 and 8 see paragraphs 5, 67 and 83).

The feature of claim 5 (different dimension for a second window) is disclosed in D2 (see page 92, first paragraph).

Hence, **the subject matter of claims 2, 4 to 8, 10, and 11 is not new.**

2.2 The features of claims 3 and 9 are not explicitly discussed in D1; however, they appear to refer to

trivial design choices; therefore, it is considered that **the subject matter of claims 3 and 9 does not involve an inventive step** in the sense of article 33(3) PCT.

2.3 The features of claim 12 are also disclosed in D1 (see paragraphs 84 and 86). They are in fact implicitly contained in the features of the method claim 1, when applied to a digital image (normally defined in orthogonal *x* and *y* coordinates; the overlap of the windows is determined by the new position, and hence by the confidence value).

Thus, **the subject matter of claim 12 is not new** by comparison to the teachings of any of the documents D1, D2 or D3.

2.5 Claims 13 to 18, all dependent on claims 1 or 12, propose different variants for the advancement of the scanning window. All these variants are known either from D1, D2 or D3 (claims 13 and 15, see D2, page 92, first 2 paragraphs; claims 14 and 16, see D1, paragraphs 84 and 86; claim 17, see D3, section 3). Thus, **the subject matter of claims 13 to 18 is not new** either.

2.6 Claims 19 to 22 refer to the usage of tracking/color filtering for the determination of regions of interest for detection. Such procedures are already known (see e.g. D2, subsections 6.3 and 6.4).

The same is true for the features of claims 23 to 27 (frontal face detection/recognition, see e.g. D2, subsection 8.3).

Hence, **the subject matter of claims 19 to 27 is also not new**.

2.7 The subject matter of claims 23 and 26 is also disclosed in D4 (see paragraphs 107 and 110), which further discloses the features of claims 28, 29 and 30, i.e. supplementary detection in a (rotated) extended region (paragraph 111).

Therefore, **the subject matter of claims 28 to 30 is also not new**.

3. The opinion hereabove is based mainly on novelty objections with respect to one or more of the documents D1 to D4. It is however noted that inventive step objections based on the combination of the teachings of one of the documents above with common knowledge could also be raised (as indicated in the search report).

Further, inventive step objections could also be formulated with respect to the combined teachings of two or more documents (e.g. the work of Rowley, i.e. D2, is well known, and is cited explicitly in D1 and D3). Moreover, the teachings of other documents cited in the search report, and not discussed here, also appear to be of high relevance for the subject matter of one or more of the claims (see the corresponding citations in the search report).